

CLAIMS

1. A temperature controlling method for a substrate processing system comprising a plurality of substrate processing units each having objects of temperature control, characterized in that

the temperatures of the objects of temperature control in the substrate processing units are controlled by distributively feeding a cooling medium to the substrate processing units from one refrigerator.

2. The method according to claim 1, wherein in each substrate processing unit, the cooling medium supplied by the refrigerator is circulated around a circuit that is laid out in the object of temperature control.

3. The method according to claim 2, wherein the temperatures of the objects of temperature control are separately controlled by separately regulating the flow velocity of the cooling medium in the circuits in the substrate processing units.

4. The method according to claim 2, wherein the following operation (a) or (b) is selectively conducted depending on the temperatures of the objects of temperature control:

(a) suspending supply of the cooling medium from the refrigerator to the circuits in the substrate processing units, and continuing to control the temperatures of the objects of temperature control substantially only by the cooling medium circulating around the circuits;  
or

(b) controlling the temperatures of the objects of temperature control by circulating the cooling medium around the circuits, while supplying the cooling medium from the refrigerator to the circuits in the substrate processing units.

5. The method according to claim 4, wherein the temperatures of the objects of temperature control are separately controlled by separately regulating the flow velocity of the cooling medium in the circuits in the substrate processing units.

6. A substrate processing system comprising:  
a plurality of substrate processing units having objects of temperature control,  
a refrigerator,  
a supply line for supplying a cooling medium from the refrigerator to the substrate processing units,  
a feedback line for feeding the cooling medium back to the refrigerator from the substrate processing units,  
circuits, each connected to the supply line and to the feedback line, which allow the cooling medium to circulate through the objects of temperature control in the substrate processing units, and  
regulating valves for regulating separately the flow rates of the cooling medium flowing into the circuits from the supply line.

7. The system according to claim 6, wherein the regulating valves are three-way valves that can switch states from  
one in which the cooling medium circulates substantially only around the circuits, to  
the other in which the cooling medium circulates between the refrigerator and the substrate processing units through the supply line, the circuits, and the feedback line, or from the latter state to the former.

8. The system according to claim 6, further comprising:  
temperature sensors for sensing the temperatures of the objects of temperature control, and  
valve controllers for controlling the regulating valves

according to the temperatures sensed by the temperature sensors.

9. The system according to claim 8, further comprising:  
heaters for heating the cooling medium circulating around the circuits, and  
heat controllers for controlling the heaters according to the temperatures sensed by the temperature sensors.
10. The system according to claim 6, wherein the circuits are provided with pumps to circulate the cooling medium.
11. The system according to claim 10, wherein the circuits are provided with buffer tanks for the cooling medium.
12. The system according to claim 6, further comprising:  
a by-pass line that by-passes the substrate processing units and links the supply line with the feedback line, and  
an on-off valve for opening or closing the by-pass line.
13. The system according to claim 6, wherein the substrate processing units are useful to process substrates with plasma produced in them.